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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,567	03/25/2004	Chih-Yu Chao	250323-1060	7970

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EXAMINER

MARKHAM, WESLEY D

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 08/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/809,567	Applicant(s) CHAO ET AL.	
	Examiner Wesley D Markham	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. **Claims 1 – 14** are currently pending in U.S. Application Serial No. 10/809,567, and an Office Action on the merits follows.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) (i.e., the certified copy of Taiwanese priority document 92117480, filed on 6/26/2003), which papers have been placed of record in the file.

Oath/Declaration

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02. The oath or declaration is defective because it incorrectly states that the inventors are original, first, and sole inventors, when it appears that the declaration should state that Chih-Yu Chao and Wen-Jiunn Hsieh are original, first, and joint inventors of the claimed subject matter.

Drawings

4. The formal drawings (3 sheets, 6 figures) filed by the applicant on 3/25/2004 are acknowledged by the examiner.
5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

"112" in Figure 1B and "208" in Figure 2. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office Action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office Action. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities:
 - Page 2, line 7: The phrase, "the conventional a polarizer" appears to contain a typographical error (i.e., the "a"), and the applicant is suggested to amend such phrase to read, "the conventional polarizer".
 - Page 8, line 5: The word, "evaporize" appears to be a typographical error, and the applicant is suggested to amend such phrase to read, "evaporate" or "vaporize".

Appropriate correction is required.

Claim Objections

7. Claims 2, 6, 9, and 13 are objected to because of the following informalities
- Claims 2 and 9: The phrase, "wherein a hardening process is used to drying said material" appears to contain a typographical error that makes the phrase confusing. The applicant is suggested to amend the aforementioned phrase to read, "wherein a hardening process is used to dry said material".
 - Claims 6 and 13: The phrase, "wherein said materials are transferred..." appears to contain a typographical error because Claims 1 and 8 (from which Claims 6 and 13 depend, respectively) only recite one "material", not plural materials. Therefore, the applicant is suggested to amend the aforementioned phrase in Claims 6 and 13 to read, "wherein said material is transferred..." in order to clearly correspond to Claims 1 and 8 and render the claims less confusing.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1 – 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al. (USPN 6,399,166 B1) in view of Noy et al. ("Fabrication of Luminescent Nanostructures and Polymer Nanowires Using Dip-Pen Nanolithography", Nano Letters, Vol.2, No.2, pages 109-112, 2002) and Piner et al. ("Dip-Pen Nanolithography", Science, Vol.283, pages 661-663, 1999).
11. Regarding independent **Claim 1** and **Claim 2**, Khan et al. teaches a polarizer manufacturing method, the method comprising depositing a pattern of different regions (i.e., by printing or photolithography) of dye material onto a base (i.e., transferring the material to a base) and then removing the solvent associated with the material (i.e., drying and hardening the material over the base) to produce a molecularly ordered dye that serves as a polarizing coating (Abstract, Figures 1 – 6, reference numbers "8" and "9", Col.3, lines 1 – 12, Col.4, lines 1 – 12, Col.7, lines 15 – 46 and 60 – 67, Col.8, lines 1 – 32, Col.9, lines 1 – 25, Col.10, lines 30 – 40 and 50 – 60, Col.11, lines 1 – 37). Khan et al. does not explicitly teach that the different regions of the dye material on the base are applied by placing the material

(e.g., the dye) on a dip-pen and bringing the dip-pen into contact with the base to transfer the material to the base. However, Khan et al. explicitly teaches that, "Using the methods of photolithography or printing techniques for the application of dyes, and using dyes of various colors, a polarizing layer with differently colored regions can be formed" (Col.9, lines 21 – 24). Noy et al. teaches that it was known in the art at the time of the applicant's invention to (1) place a material, specifically a dilute dye solution, on a dip-pen, and then (2) bring the dip-pen into contact with a base (e.g., glass) in order to transfer the dye to the base in a desired pattern or configuration (Abstract, Figure 1, and page 109). This patterning method is known as dip-pen nanolithography, or DPN (page 109, col.1). Noy et al. teaches that the DPN method is ideally suited to fabricate surface patterns (page 109, col.1). Additionally, Piner et al. teaches that, when compared to conventional pattern forming methods such as lithography (i.e., a method explicitly taught by Khan et al.), DPN has the following advantages: (1) it can deliver relatively small amounts of material to a substrate, (2) it does not rely upon complicated processing methods or sophisticated non-commercial instrumentation, and (3) it is less expensive (page 661, last column, page 662, first line, and page 663, last paragraph). Therefore, it would have been obvious to one of ordinary skill in the art to deposit the desired pattern of different regions of dye material(s) in the polarizer production process of Khan et al. by using DPN (i.e., placing a material (the dye solution) on a dip-pen, and then bringing the dip-pen into contact with a base in order to transfer the dye to the base, as taught by Noy et al. and Piner et al.) prior to removing the solvent from

the applied dye material (thereby drying / hardening the dye) with the reasonable expectation of (1) success, as Noy et al. teaches that DPN can be utilized to deposit a dye pattern on a substrate such as glass (i.e., a substrate taught by Khan et al.), and (2) obtaining the benefits of using DPN to form the desired regions of dye(s), such as performing the process more simply and economically in comparison to using the photolithographic method suggested by Khan et al. Regarding **Claim 3**, Khan et al. also teaches that the dye is a dichroic material (Col.3, lines 1 – 10, Col.8, lines 15 – 21, Col.10, lines 30 – 40). Regarding **Claim 4**, the combination of Khan et al., Noy et al., and Piner et al. does not explicitly teach that the material is “birefringent”. However, the dye material of Khan et al. has a liquid crystalline structure / phase (Abstract, Col.3, lines 11 – 12, Col.4, lines 1 – 3, Col.7, lines 15 – 17) and can also include a liquid crystalline polymer (Col.7, lines 34 – 37). Therefore, the dye material of Khan et al. is “birefringent” (see, for example, Yamahara et al. (USPN 5,506,706) (Col.3, lines 46 – 50, Col.4, lines 19 – 23, Col.5, lines 22 – 23), which is cited simply to show that liquid crystalline materials are, in fact, birefringent, as required by Claim 4). Regarding **Claim 5**, the combination of Khan et al., Noy et al., and Piner et al. also teaches that the dip-pen is a tip of an atomic force microscope (AFM) (Noy et al., page 109; Piner et al., page 661, col.1). Regarding **Claim 6**, the combination of Khan et al., Noy et al., and Piner et al. also teaches that the material is transferred to the polarizer base by capillarity (Abstract, Figure 1, and page 662, second full paragraph, of Piner et al., which teaches that DPN transfers material to a substrate surface by capillary action). Regarding **Claim**

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7, Khan et al. also teaches that a transparent macromolecule material or glass is used to form the polarizer base (reference numbers "1" and "2"; Col.7, lines 60 – 62, Col.10, lines 55 – 59).

12. Claims 8 – 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khan et al. (USPN 6,399,166 B1) in view of Noy et al. ("Fabrication of Luminescent Nanostructures and Polymer Nanowires Using Dip-Pen Nanolithography", Nano Letters, Vol.2, No.2, pages 109-112, 2002) and Piner et al. ("Dip-Pen Nanolithography", Science, Vol.283, pages 661-663, 1999), and in further view of Rudin (USPN 6,522,382 B1).
13. The combination of Khan et al., Noy et al., and Piner et al. teaches all the limitations of **Claims 8 – 14** (which mirror Claims 1 – 7) as set forth above in paragraph 11, except for a method comprising performing a hardening process to harden the protection layer. Please note that Khan et al. does teach forming a "protection layer" over a surface of the base (see Figures 1 – 6, reference numbers "6", "7", "10", "11", and/or "13", any of which are reasonably construed to be a "protection layer" over a surface of the base – Col.4, lines 11 – 12, Col.7, lines 64 – 66, Col.8, lines 22 – 32, and Col.9, lines 1 – 5), as required by the claims. Further, Khan et al. teaches that the protection layer "6" and/or "7" is a dielectric film made of a polymer (Col.7, lines 64 – 66, Col.8, lines 24 – 26), but is silent regarding how this dielectric polymer film is applied / formed. Rudin teaches that, in the art of producing an LCD (Abstract), a dielectric polymer layer (i.e., a layer analogous to the layers "6" and "7" of Khan et

al.) is formed by depositing a resin layer by, e.g., spin coating, and then heat curing the resin to form the layer (Col.4, lines 26 – 35). Therefore, it would have been obvious to one of ordinary skill in the art to produce the polymeric protection layer(s) of Khan et al. by depositing an appropriate resin and then curing (i.e., hardening) the deposited resin to form the polymeric layer (as taught by Rudin) because doing so would achieve the goal of Khan et al. of producing a protective polymeric layer in a manner conventionally known in the art of LCD device production. If the polymer layer of Khan et al. was not cured and hardened, one of ordinary skill in the art would not have expected the layer to perform the function desired and required by Khan et al. (i.e., protection), thereby defeating the purpose of depositing the layer.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Miroshin et al. (USPN 6,767,594 B1) teaches a method of making a patterned polarizer for an LCD in which a dichroic and/or birefringent dye is printed onto a substrate. Hamley ("Nanotechnology with Soft Materials", Angew. Chem. Int. Ed., 42, pages 1692-1712, 2003) teaches that DPN can be performed with multiple pens / AFM tips. Mirkin et al. (US 2003/0157254 A1) teaches a general process of using DPN to deposit a material in a desired pattern on a substrate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571)

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272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


WDM

Wesley D Markham
Examiner
Art Unit 1762


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